REMARKS

This reply is filed in response to the office action dated March 7, 2005. Reconsideration of the application and the claims is respectfully requested.

Claim Rejections – 35 U.S.C. §102(b), §103(a)

Claims 1-5, 7, 8 and 27-46 stand rejected under 35 U.S.C. §102(b) as allegedly being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as allegedly being obvious over Lee, U.S. Patent 3,925,235. Applicants respectfully traverse the rejection.

Lee does not disclose, suggest, or teach every element claimed in independent claim 1. Lee's process cannot occur in the method claimed in the present application. For instance, Lee requires that its two reactants react with the semiconductor and undergo a chemical exchange of charges, as in ionic chemical reactions. The charge exchange excites the electron (e) or hole (p) carriers. Therefore, Lee's reactants form electronic excitations with the semiconductor by directly reacting with its semiconductor. Without the direct reaction with the semiconductor, Lee cannot excite carriers.

On the other hand, the present application claims "highly vibrationally excited molecules" created "using reactants." The "highly vibrationally excited molecules" includes molecules with energetic vibration of the reactants, which are placed "near a conducting surface for electron-jump effect to occur." The "highly vibrationally excited molecules" are not electronic excitations disclosed in Lee. Rather, the "highly vibrationally excited molecules" in the present application refer to mechanical vibrations of atoms and molecules against each other, whose vibrational energy, that is, kinetic energy, is carried away by the electrons of the conducting surface when electron-jump effect occurs. Unlike in Lee, the independent claims of the present application does not recite direct reaction with a semiconductor. In fact, the claimed

"conducting surface" acts as a barrier against such direct reactions disclosed in Lee. The independent claims recite that "excited carriers" are created by having at least some of the kinetic energy of the highly vibrationally excited molecules to be transferred to electrons of the conducting surface in an "electron jump" process. This process is different from Lee's charge transfer reactions.

Applicants reiterate that Lee's exothermic charge transfer chemical reaction on the surface of a solid state catalysts (semiconductor) does not disclose, suggest, or teach at least the claimed "highly vibrationally excited molecules" that is coupled "with electrons by placing the highly vibrationally excited molecules near a conducting surface for electron-jump effect to occur" and "causing at least some of kinetic energy of the highly vibrationally excited molecules to transfer to the electrons of the conducting surface, resulting in excited carriers being created." For the same reasons, Applicants disagree with the Office Action that erroneously concludes that "the presently claimed coupling, creating, collecting, and converting steps, and the presently claimed inverted population, would obviously have been present once Lee's method is performed." Not only are the methods claimed in independent claims of the present application different from Lee, but also Lee's process cannot occur in the methods claimed in claims 1 and 37. For at least the foregoing reason, Lee does not anticipate or makes obvious the independent claims 1 and 37, and the respective pending dependent claims by virtue of their dependencies.

Claims 1-3, 7, 8, and 27-46 stand rejected under 35 U.S.C. 102(a) by or, in the alternative, under 35 U.S.C. 103(a) over Nienhaus et al, "Direct detection of electron-hole pairs generated by chemical reactions on metal surfaces." Applicants respectfully traverse the rejection.

Nienhaus et al. does not disclose, suggest, or teach at least creating "highly vibrationally excited molecules" where "products of the catalytic reaction desorb and leave" as recited in independent claims 1 and 37. Rather, Nienhaus et al. discloses a sensor device that detects "chemicurrent." The chemicurrent process as it is now understood can never generate more than a trickle, 2% at most. The efficiency cannot increase in the chemicurrent process, even if the chemicurrent reaction were to be accelerated, for example, using a catalyst. Known theories show that the number of chemicurrent electrons with a given energy would decrease exponentially as the energy increased above some low value, of order 0.1 eV. In principle, it was theorized, energy distribution should "diverge" to a large number as the electron energy decreased towards zero. Chemicurrent arises when the energy of reactants form an adsorbate on the surface of a conductor. Nienhaus et al. creates adsorbates, not "higly vibrationally excited molecules." The adsorption releases some of the energy directly into electrons, giving 2% or less of them an energy that can be detected as a short circuit current in a semiconductor diode. Because the electron current is so low, a continuous open circuit voltage across the diode cannot rise above tens of millivolts.

Sharply contrasting the chemicurrent device and method, the independent claims in the present application recite an element of creating "higly vibrationally excited molecules," and another element referred to as "electron jump" to transfer at least some of the molecule kinetic energy into an electron in a conductor. By using a reactant and catalyst combination where the products of the reaction desorb and leave the reaction surface, spent reaction products are removed and cleared away, preventing accumulation of any monolayer of spent products.

Accordingly, Nienhaus et al. for at least the foregoing reasons does not disclose, suggest, or teach every element claimed in claims 1 and 37. By their dependencies, Nienhaus et al. does not disclose, suggest, or teach dependent claims.

Double Patenting

With respect to the double patenting rejection over U.S. Patent 6,678,305, Applicants respectfully submit that the claims in the present application are not obvious over the claims in that patent, for instance, at least because the claims in that patent do not recite the "converting" step recited in claim 1 of the present application. Further, with respect to the double patenting rejection over the co-owned patents, while Applicants do not concede to the propriety of the double patenting rejection in the Office Action, Applicants will submit a terminal disclaimer to obviate the rejections if needed to expedite the application to issue.

With respect to the provisional double patenting rejections over the co-pending co-owned applications, since they are provisional, Applicants respectfully request that the Examiner withdraw these rejections when all other rejections are resolved.

With this reply, new claims 47, 48 and 49 are being presented. All pending claims are believed to be patentable and a favorable Office Action is hereby earnestly solicited. If a telephone interview would be of assistance in advancing prosecution of the subject application, the Examiner is requested to telephone the number provided below.

Please charge any fee due associated with this reply to Deposit Account No. 02-0393.

Respectfully submitted,

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